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L9	L8 and scroll	4	L9
L8	L7 and coordinate	9	L8
L7	L6 and on/off	15	L7
L6	touch with panel and cursor with control$ and key with switch$	84	L6
L5	touch withpanel and cursor with control$ and key with switch$	102263	L5
L4	touchpanel with cursor with control$ and key with switch$	0	L4
L3	touch panel with cursor with control$ and key with switch$	102311	L3
L2	L1 and (keys or switches)	2	L2
L1	5677711	3	L1

END OF SEARCH HISTORY

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L4: Entry 1 of 1 File: USPT Oct 11, 1994

DOCUMENT-IDENTIFIER: US 5355148 A
TITLE: Fingerpoint mouse

US PATENT NO. (1):
5355148

Detailed Description Text (34):
In one embodiment, each data packet comprises three bytes of binary data and has several fields. For example, some fields of the data packet contain data indicating the state (inactive or active) of the left button 114 or right button 116, fields contain a number of X and/or Y counts (i.e., increments of directional movement in the X and/or Y directions, as utilized by the mouse driver to move the cursor on the screen) and fields contain data indicating whether an overflow has occurred in the X counts or Y counts.

L16: Entry 1 of 1 File: USPT May 1, 2001

DOCUMENT-IDENTIFIER: US 6225976 B1
TITLE: Remote computer input peripheral

Assistant Examiner (1):
Zamani; Ali

Brief Summary Text (7):
A user interface controls remote location meetings and conferences where computerized data and document sharing takes place through a teleconferencing or a video conferencing medium. Currently, the user interface for the above applications involves employing multiple devices such as a projector remote control, a microphone, a mouse, a wireless keyboard, a digitizer pad, and a phone. A problem with employing multiple devices for the user interface is that users must manipulate many devices making the user interface less friendly.

Brief Summary Text (14):
In carrying out the above objects and other objects, the present invention provides a hand-held remote computer input peripheral for communicating with a host computer having a graphical user interface with a cursor and other objects. The input peripheral includes a housing having a top surface, first and second opposed side surfaces, and a rear surface. A human operator holds the housing in space by using a first hand to grip the first side portion. A touch pad is positioned in the top surface of the housing such that the operator manipulates the touch pad using a second hand. A plurality of activation mode buttons are positioned in the top surface of the housing. Each of the activation mode buttons corresponds to a respective activation mode of the touch pad. The operator switches between activation modes by pressing the activation mode buttons with the second hand. A plurality of function keys are positioned in the top surface of the housing. Each of the function keys corresponds to a respective user-defined function. The operator actuates functions by pressing the function keys using the first hand while manipulating the touch pad with the second hand. A click button is positioned on the housing to be actuated by the first hand of the operator. The operator actuates the click button with the first hand while manipulating the touch pad with the second hand.

Detailed Description Text (2):
Referring now to FIGS. 1-4, a remote computer input peripheral 10 in accordance with a preferred embodiment of the present invention is shown. Input peripheral 10 includes a top surface 12 having a touch pad 14, a pan and scroll bar region 16, a set of user-definable function keys 18, and a row of activation mode buttons 20. Touch pad 14 provides information indicative of the position of an operator's finger or stylus touching the touch pad to a computer (not shown) through a communications link located on a rear surface 24 of input peripheral 10. The communications link communicates with the computer using a hard wire connection (not shown) or optically with a pair of light emitting devices (LEDs) 26. The computer processes the information to control fluctuations of a graphical user interface producing a display having a cursor. An operator may also select commands or manipulate graphically portrayed objects in the graphical user interface.

Detailed Description Text (3):
Touch pad 14 reports the entry of pressure, relative motion, absolute position, tap,

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End of Result Set

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L6: Entry 1 of 1 File: USPT Sep 1, 1987

DOCUMENT-IDENTIFIER: US 4691144 A
TITLE: Staggered refresh pulse generator for a TFEL panel

US PATENT NO. (1):
4691144

Abstract Text (1):
A TFEL panel includes orthogonally disposed sets of scanning and data electrodes. The scanning electrodes are strobed with a preconditioning voltage and data is provided to selected data electrodes simultaneously with the line by line strobing of the scanning electrodes. A refresh pulse is applied to the screen once per frame of data at times which vary from frame to frame. This may be accomplished either by varying the time of occurrence of the refresh pulse within each frame or by holding the time of occurrence of the refresh pulse constant and varying the strobing sequence of the scanning electrodes. This technique prevents certain portions of the screen from generating a latent image due to charge accumulation which would otherwise result from the timing asymmetry between the scanning of certain electrodes and the fixed timing of the refresh pulse.

Brief Summary Text (2):
The present invention relates to thin film electroluminescent (TFEL) panels which include a layer of electroluminescent material sandwiched between dielectric plates containing orthogonally disposed electrodes to form a matrix of pixels.

Brief Summary Text (3):
TFEL panels may conventionally comprise a matrix of pixels formed by the intersections of a plurality of row electrodes and a plurality of column electrodes. These electrodes are situated on plates disposed on either side of a thin electroluminescent layer of material such as zinc sulfide. The row electrodes are energized in turn, usually from the top of the screen to the bottom, once per frame with a voltage often termed a "write" voltage. Simultaneously with the energization of each row electrode with the write voltage, selected column electrodes are energized with a modulation voltage which raises the potential across the electroluminescent film to a level above its threshold of luminescence, thus illuminating selected pixels in that row. Once all the rows have been energized in this fashion, a frame of data is completed. At the end of a frame of data it is necessary to remove the accumulated charge across the screen. This is accomplished by applying a "refresh" voltage pulse to all of the row electrodes simultaneously at the end of a frame of data. The refresh pulse is opposite in polarity to that of the write voltage pulse and is approximately equal in amplitude to the combination of the write voltage pulse plus the modulation voltage pulse. A typical driving architecture for such a system is described in copending patent application No. 729,974 which is assigned to the same assignee.

Brief Summary Text (6):
The present invention provides a means for eliminating the differential aging effect in TFEL screens by staggering the timing of the refresh pulse with respect to the scanning of the row electrodes refresh pulse, as that term is used herein, refers to a pulse having a magnitude equal to that used to cause luminescense but of opposite polarity so as to remove accumulated charge on the panel once during each frame. It is applied simultaneously to all row electrodes. The invention includes a refresh

pulse generator which may be programmed to generate a refresh pulse at variable times with respect to the time of energization of each of the row electrodes. Over a plurality of frames of data, the timing of the refresh pulses and the write pulses with respect to any given pixel will tend to be symmetrical, on the average. This is accomplished by stepping the generation of the refresh pulse in time in equal increments each frame. Thus, during the first frame, the refresh pulse may occur at the end of the frame and in subsequent frames it may advance to a temporal position three-quarters of the way into the frame, half-way through the frame, and so forth. Thus, the refresh pulse is applied at variable times within sequential frames advancing in equal increments which progress in a step-wise fashion either from the end of the frame to the beginning of the frame or vice versa.

Drawing Description Text (2):
FIG. 1 is a schematic diagram of conventional driving architecture for a TFEL panel.

Drawing Description Text (3):
FIG. 1A is a wave form diagram illustrative of one conventional method of driving the panel of FIG. 1.

Drawing Description Text (6):
FIG. 4 is a block schematic diagram of driving architecture of a TFEL panel which implements the wave forms of FIG. 3.

Drawing Description Text (8):
FIG. 5 is a schematic diagram of a circuit for controlling the column voltages for the panel illustrated in FIG. 4.

Drawing Description Text (12):
FIG. 8 is a block schematic diagram of driving architecture for a TFEL panel for implementing the row scanning sequence in FIG. 7.

Detailed Description Text (2):
A TFEL, panel 10 is illustrated in FIG. 1 which shows conventional driving architecture. A pixel 12 is formed at the intersection of a row electrode 14 and a column electrode 16. The electrode 16 is driven by a column driver 18 and the row electrode 14 is driven by a row driver 20. Logic circuitry (not shown) provides signals for the row drivers and column drivers on lines 22 and 24, respectively.

Detailed Description Text (3):
Referring now to FIG. 1A, row electrodes 26, 28 and 14 are shown as driven by a row composite voltage which comprises a series of write pulses labeled V.sub.w. At the same time the column electrodes 30, 32, 34, 16 and 36 are driven by a column composite voltage labeled V.sub.m. After all of the rows have been scanned with the pulses v.sub.w, a refresh pulse v.sub.R is provided simultaneously to all of the row electrodes 26, 28 and 14. There may be, for example, 256 row electrodes together with their associated drivers and 512 column electrodes for a typical TFEL panel 10.

Detailed Description Text (4):
FIG. 2 illustrates the time asymmetry between the write and refresh pulses for the top and bottom rows, as opposed to the symmetrical wave form illustrated for the middle row. Using the driving architecture of FIG. 1, the write/modulation (V.sub.w -V.sub.m) pulses for pixels in the top and bottom rows occur temporally adjacent to the refresh pulse. There is a relatively long period of time between these pulses and the next refresh pulse for both these sets of pixels. By contrast the pixels in the middle row experience a nearly symmetrical charging and discharging. It is the asymmetrical waveform, at the top and bottom of the panel 10 that produces the differential aging effect described above.

Detailed Description Text (8):
It is a property of TFEL screens that lit pixels respond to refresh pulses by emitting light but only to the extent that the pixel was originally charged. FIG. 6 illustrates this concept showing that there is light output from a pixel as a result of a write pulse and again as a result of the refresh pulse which is later in time.

The light output resulting from the refresh pulse is equal in amplitude to that caused by the write pulse. If, instead of a write pulse, a polarity compensation pulse is utilized between two adjacent refresh pulses, a low amplitude light output is generated. The same low amplitude output is generated by the refresh pulse. If the amplitude of the polarity compensation pulse is such that it causes the pixel to emit approximately half the light as would be emitted by the normal write pulse, there will be three light output pulses in quick sequence from those pixels in the row in which the refresh pulse is stepped past the write pulse. To the viewer, however, the light output will appear to be the same because, the eye responds to the total light output over a period of time that is much longer than the widths of the pulses driving the TFEL panel. Thus, the group of pulses at the center of the light output line, comprising two pulses whose amplitude is half of that of the following pulse, will appear to the eye to have the same intensity as the other pulse groups of two pulses each.

Detailed Description Text (9):
A schematic block diagram of a circuit for implementing the waveforms illustrated in FIGS. 3 and 6 is shown in FIG. 4. A shift register 40 holds one line of data; that is, as the row drivers 42 are sequentially strobed, the contents of the shift register 40 are provided to column drivers 44. The strobing of the row drivers 42 and the providing of the refresh pulses at variable times with respect to the particular row being scanned, is under the control of controller 46. The controller 46 is linked to an external computer or data processing system by interface signaling lines 48a, 48b, and 48c which may comprise horizontal and vertical synchronization and a video clock, respectively. Controller 46 is also connected to column composite generator 50 and row composite generator 52. These generators provide high voltage pulses for the column drivers 44 and row drivers 42.

Detailed Description Text (10):
Since the refresh pulse is incrementally shifted in time once per frame, it occurs in the middle of the frame at a time when lines of data would normally be written. Tne width of the refresh pulse is such that it requires the same amount of time that would normally be taken to write three lines of data. Thus, the scanning of the row drivers 42 and the simultaneous generation of modulation pulses from the shift register 40 must be halted temporarily to accommodate the refresh pulse. Since data is being provided at a continuous rate, it must be held in a FIFO data buffer 54 and delayed while the refresh pulse is being applied to the screen. The buffer 54 is of the first-in, first-out type which has a depth of approximately three lines of data. Thus, when a refresh pulse is to be applied to the screen, the controller 46 instructs the data buffer 54 to stop its output to the shift register 40 and to accumulate lines of data. When the refresh pulse is turned off the data buffer supplies the delayed data lines to the shift register 40 on a first-in, first-out basis.

Detailed Description Text (11):
The controller 46 of FIG. 4 is shown in more detail in FIG. 4(a). A row counter 31 is responsive to vertical and horizontal synchronization signals on lines 48b and 48a respectively to keep track of the row which is currently being written. This counter is incremented by one after scanning a row and controls the writing of the panel which is scanned one row at a time from the top to the bottom of the screen 10. The output of the counter is applied to the write control 33 which in turn provides the controlling signals for the row and column drivers. A refresh counter 35 controls the positon in time of the refresh pulse relative to the row being scanned. Refresh counter 35 normally counts at the same rate as row counter 31. A step timer 37 periodically applies a signal to the refresh counter 35 which causes this counter to count by one row less than the previous frame. This causes the refresh pulse to occur one row in time sooner than the previous refresh pulse. Depending upon how the step timer is programmed, the refresh counter may advance sequentially, one frame at a time, or may remain stationary for several frames before advancing.

Detailed Description Text (12):
The outputs of the refresh counter 35 are provided to a refresh control 39 and a modulation control 41 which in turn provides signals to row and column composite generators 50 and 52 respectively. Additional outputs of row counter 31 and refresh

counter 35 are applied to FIFO control 43 which in turn provides write and read signals for FIFO data buffer 54. FIFO control 43 is also responsive to a video clock input line. Until a refresh pulse occurs, video data passes straight through the FIFO data buffer 54 without being stored. When a refresh pulse occurs, however, the FIFO data buffer begins storing data and does so for three lines. After the refresh pulse is terminated, the data out of the FIFO data buffer 54 is read out at the same rate as the incoming data. However, since the refresh pulse has occurred the data being displayed is delayed by three lines to correspond with the row being scanned.

Detailed Description Text (15):
Referring now to FIG. 8, this schematic diagram shows a circuit for implementing the scanning sequence shown in FIG. 7. Interface signal inputs 60 are connected to a controller 62 which contains all of the logic circuitry necessary to control the timing of pulses applied to the row and column electrodes 64 and 66, respectively. The row electrodes 64 are driven by a shift register 68 which in turn is driven by a scan sequence controller 70. The incoming data line 72 is connected to a frame buffer 74 which controls a shift register 76. The scan sequence controller 70 controls the order in which the rows are energized with a write pulse during each data frame. Thus, 256 times per frame the scan sequence controller loads a digital code into the shift register which designates one of the row electrodes 64 to be energized. The sequence of energization of the row electrodes 64 is chosen such that on the average, all of the row electrodes experience the same degree of time asymmetry with respect to the timing of the refresh pulse.

Detailed Description Text (16):
Throughout this application it has been assumed that the row electrodes are to be used as scanning electrodes and that data is entered on the column electrodes. There is, however, no particular requirement that the panel be illuminated in this manner, and it should be understood that the scanning and data functions could be switched between the row and column electrodes. Similarly, use of the invention herein does not depend upon which set of electrodes is supplied with the refresh pulse, since it is necessary only to supply this pulse to the screen at times which vary with respect to whichever set of electrodes performs the scanning or preconditioning of the screen in anticipation of data pulses supplied to the other set of electrodes.

CLAIMS:

1. In a TFEL panel having a first plurality of scanning electrodes and a second plurality of data electrodes, said first and second pluralities of electrodes being orthogonally disposed with respect to each other and forming a matrix of pixels, the combination comprising:

(a) means for selectively energizing each of said scanning electrodes one at a time until all such electrodes have been energized so as to complete a frame of data;

(b) means for selectively energizing certain ones of said data electrodes simultaneously with the energization of each of said scanning electrodes so as to illuminate selected pixels within said matrix; and

(c) refresh pulse generator means for generating a refresh pulse once per frame of data during a time interval when no scanning electrode is energized, wherein said refresh pulse occurs at a different time during each sequential frame of data with respect to the energization of each of said scanning electrodes.

8. The combination of claim 4 wherein said refresh pulse generator means includes means for incrementally shifting the timing of said refresh pulse once per frame of data.

11. The combination of claim 4 wherein said compensation pulse is applied to said scanning electrodes simultaneously with the application of a second compensation pulse applied to said data electrodes.

12. In a TFEL screen having scanning electrodes which are energized according to a predetermined sequence, and having data electrodes which are selectively energized, a refresh pulse generator for providing refresh pulses at times which vary with

respect to the times of energization of each of the scanning electrodes.

14. The refresh pulse generator of claim 12 wherein the refresh pulses are provided at a fixed time relative to beginning of the predetermined sequence of energizing said scanning electrodes and said predetermined sequence varies from one frame of data to the next frame of data.

15. The refresh pulse generator of claim 12 wherein the scanning electrodes are row electrodes and the data electrodes are column electrodes.

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L5: Entry 2 of 24 File: USPT Oct 30, 2001

DOCUMENT-IDENTIFIER: US 6310615 B1
TITLE: Dual mode eraser

Brief Summary Text (18):
In another embodiment, a detector assembly is provided which comprises a housing for mounting to the writing surface; a plurality of signal receivers; and at least one user activated control switch whose activation by a user when the detector assembly is mounted to the writing surface produces a control signal which causes the transcription system to perform a function in response.

Brief Summary Text (19):
According to this embodiment, activation of one of the control switches can cause an image displayed on a monitor operatively connected to the transcription system to be modified. Activation of one of the control switches can also cause at least a portion of an image displayed on a monitor operatively connected to the transcription system to be erased, saved, printed, electronically mailed, or facsimilied. Activation of one of the control switches can also cause a writing property associated with a stylus by the transcription system to be changed. Activation of one of the control switches can also cause a color associated with a stylus by the transcription system to be changed.

Brief Summary Text (43):
According to any of the stylus embodiments, stylus may further include a reference signal transmitter for transmitting a reference signal when the writing element is sensed by the contact switch to be in contact with the writing surface. The reference signal transmitter may transmit a variety of signals including infra-red signals and ultrasound signals.

Brief Summary Text (44):
According to any of the stylus embodiments, the stylus may further include a contact switch for sensing when the writing element is contacted with a writing surface, the position signal transmitter transmitting the position signal when the writing element is sensed by the contact switch to be in contact with the writing surface. According to this variation, the stylus may further include a reference signal transmitter which transmits a reference signal when the writing element is sensed by the contact switch to be in contact with the writing surface.

Brief Summary Text (94):
activating a user activated control switch mounted on the writing surface;

Brief Summary Text (95):
producing as a result of activating the user activated control switch a control signal which is communicated to the transcription system; and

Brief Summary Text (97):
According to the method, activation of the control switch may cause at least a portion of an image displayed on a monitor operatively connected to the transcription system to be modified.

Brief Summary Text (98):
Also according to the method, activation of the control switch may cause at least a portion of an image displayed on a monitor operatively connected to the transcription system to be erased, saved, printed, electronically mailed or

facsimilied.

Drawing Description Text (44):
FIG. 7D illustrates a detector assembly which includes a hardware unit with control switches and indicators.

Detailed Description Text (16):
The control sections 32 can also be used to control the various functions of other programs. For instance, during a presentation to a group, the transcription system can be used simultaneously with other programs such as POWER POINT. For example, positioning the writing portion of the stylus within a particular control section 32 can cause POWER POINT to move to the next slide or display. Similarly, positioning the writing portion of the stylus within a different section 32 can cause POWER POINT to move to the previous slide or display. As a result, a user can scroll through the slides of a presentation and capture any notes the user makes on a writing surface 28 during the presentation. In this regard, the template can also function as a remote control or mouse for the system for various computer applications.

Detailed Description Text (32):
The user interface 24 can be used to control the display 48 on the to calculator image 46. For instance, if the user interface includes a keyboard which is typically used with a PC, the keys on the keyboard can be used to control the display 48 on the calculator image 46. For instance, pressing the number 2 on the keyboard can cause the number 2 to appear in the display 48. Further, if the user interface includes a mouse or other cursor control device, the cursor can be aligned with the keys illustrated on the calculator image 46. Clicking the mouse while the cursor is aligned with a particular key causes the function associated with that key to occur.

Detailed Description Text (35):
When the calculator image 46 is called up, the calculator image 46 can to replace the monitor image area 36 on the monitor 22 or can appear over the monitor image area 36 as illustrated in FIG. 1F. When the calculator image 46 appears over the monitor image area 36, the user can switch between the monitor image area 36 and the calculator image 46 by using a user interface 24 such as a mouse to position a cursor on the calculator image 46 or the monitor image area 36. As is known in Windows technology, when the cursor is positioned on the calculator image 46, the calculator image 46 will be moved to the front so it is in full view. Similarly, when the cursor is positioned on the monitor image area 36, the monitor image area 36 will be moved to the front so it is in full view.

Detailed Description Text (39):
Further, the display 48 can also be included on the hardware unit 14. For instance, the hardware unit 14 can include a liquid crystal or LED display as are commonly available in calculators. The display can then be controlled by positioning the stylus in the control sections on the template 18 or by activating control switches on the hardware unit.

Detailed Description Text (101):
The activation electronics 82 can include a contact switch which indicates when the stylus 10 is being used to write. The contact witch typically works based on pressure being exerted between the stylus 10 and a writing surface 28. In operation, the stylus 10 is held such that the tip 94 of the writing instrument is contacted with the writing surface 28. The pressure of the writing instrument on the writing surface 28 closes the contact switch to activate a circuit within the implement electronics 104.

Detailed Description Text (132):
The activation electronics 82 on the eraser 16 can include a contact switch. The pressure of the eraser pad 122 on the writing surface 28 drives the eraser pad 122 against the contact switch closing the contact switch and activating a circuit within the implement electronics 104. Activating the implement electronics 104 can serve to signal the eraser's 16 operation to the hardware unit 14 and/or the processing unit 20 in a similar manner as discussed with respect to the stylus 10.

Detailed Description Text (137):
As illustrated, the eraser pad 122 may be sized to be a little smaller than the perimeter of the eraser. This sizing of the eraser pad 122 serves to prevent the user from using an edge of the eraser to erase with since erasing using an edge of the eraser may not cause the contact switch on the eraser to be depressed and erasing movement to be detected. This sizing of the eraser pad thus forces the user to place the eraser pad surface parallel to the writing surface in order to erase.

Detailed Description Text (162):
The detector assembly may include a plurality of control switches 182 and an indicator 184, as illustrated in FIGS. 7D, 7F and 7G. The user can activate each control switch 182 to control various functions which are performed by the processing unit 20 or the hardware unit 14. For example, activating a control To switch can cause the current monitor image 34 to be saved; cause the current monitor image 34 to be saved and moved to the background while a new monitor image area 36 is brought to the foreground for the creation of a new monitor image 34; cause the current monitor image 34 to be moved to the background while a new monitor image area 36 is brought to the foreground for the creation of a new monitor image 34; cause a copy of the current monitor image to be saved in the background while the current monitor image remains in the foreground for any additional adjustments; cause the entire monitor image 34 to be erased while retaining the current monitor image area 36 in the foreground; bring a new monitor image area 36 into the foreground; maximize the current monitor image area 36 to fill the available space on the monitor; bring the last monitor image area 36 to the foreground when another program was last used in the foreground; notify the processing unit 20 that an overlay has been positioned on the writing surface; notify the processing unit 20 that an overlay has been removed form the writing surface; enable or disable selected functions; change or select the color of particular strokes on the monitor image 34; change the particular color correlated with a particular stylus 10; fax the monitor image 34; E-mail the monitor image 34; and/or print the monitor image 34. As discussed, certain embodiments of the transcription system require calibration, and activating a particular control switch can initiate calibration or recalibration. As discussed, the transcription system can be used simultaneously with other programs. Activating the control switches can serve to control the various functions of these other programs. For instance, actuating a particular control switch can cause POWER POINT to move to the next slide or display. Similarly, activating a different control switch 182 can cause POWER POINT to move to the previous slide or display. A wide variety of additional system functions can be envisioned and are intended to fall within the scope of the present invention.

Detailed Description Text (163):
The indicators 184 can be used to indicate to the user a condition of the system. For instance, an indicator 184 can be an LED which flashes when a power source within the stylus 10 is running low in power, to acknowledge that a control switch 182 has been activated and/or to acknowledge that an error condition has occurred.

Detailed Description Text (164):
As illustrated in FIGS. 6A, 7B and 7C, the first and/or the second detector 12A, 12B can include a contact switch 186 coupled with the detector electronics 130. The contact switch is closed when the detectors 12A, 12B is positioned adjacent the writing surface 28 and is opened when the detectors 12A, 12B are removed from the writing surface 28. The detector electronics can include logic for identifying when the contact switch has gone from closed to open. In response, the detector electronics 130 can provide a re-calibrate signal which is received by the hardware unit 14. The hardware unit 14 includes logic for identifying the re-calibrate unit.

Detailed Description Text (177):
In each of FIGS. 8A-8C, the hardware unit 14 includes control switches 182. Signals from the control switches 182 and the position signal receiver 60 are received by the hardware controller 200. Suitable control switches 182 include, but are not limited to toggle switches and contact switches. Each hardware unit 14 also includes indicators 184 which can be activated by the hardware controller 200 or the processing unit. The indicators can be used to indicate to the user various conditions of the system. Suitable indicators include, but are not limited to, an

LED, an LCD display, an LED display, a speaker for providing audible messages, a beeper and a buzzer.

Detailed Description Text (178):
In operation, the control switches 182 can be activated by the user. Based on the particular control switch 182 which is activated, the hardware controller 200 can perform a particular function itself or can load a second control signal onto the bus 206. The processing unit 20 can include logic for identifying the second control signal and carrying out a function in response to the particular control signal. Examples of functions which can be carried out by the hardware unit 14 or the processing unit are described above.

Detailed Description Text (188):
The hardware units 14 illustrated in FIGS. 8A-8C can include an internal power source such as a battery or can include a cable to an external power source such as a wall socket or the processing unit 20. The hardware units 14 can also include a power switch, such as a toggle switch, for turning the hardware unit 14 on and/or off. One of the indicators 184 can indicate whether the hardware unit 14 is on or off. For instance, the indicator 184 can be an LED which is lit when the hardware unit 14 is switched in. Further, the hardware unit 14 can include a power level sensor for detecting a level of power available to the hardware unit 14. When the available power level falls below a particular threshold level, this can be indicated to the user by an indicator 184. For instance, the indicator 184 can be an LED which is lit when the power level falls below the threshold or an LED used to indicate whether the hardware unit 14 is on or off can flash when the power level falls below a particular threshold.

Detailed Description Text (198):
FIGS. 11A-11B illustrate how the time of flight measurements may be translated into an image on a monitor image area 36. The first and second detectors 12A, 12B are displaced by a distance, L. The writing area 38 has a width dimension, W, a height dimension, H and a diagonal direction, D. Similarly, the monitor image area 36, has a width dimension, w and a height dimension h. Each of these dimensions are illustrated in FIG. 11A. The L, H and W dimensions can be known values or can be determined during calibration of the system. Once, the H and W dimensions are determined, the monitor image area 36 is created on the monitor 22. The monitor image area 36 is created with a h:w ratio which matches the ratio of H:W. As a result, the actual h and w values can vary. After the monitor image area 36 is created, the size and dimensions of the monitor image area 36 can be adjusted by the user using traditional techniques for manipulating windows. For instance, a mouse can be used to click and drag an edge or corner of the monitor image area 36. Further, the size of the monitor image 34 relative to the monitor image area 36 can be magnified and reduced by the user with traditional techniques for magnifying and reducing images on a monitor. An example of a typical techniques for user magnification and reduction of images and image areas is used in drawing programs such as VISIO, etc. Scroll bars can be included on the monitor image area 36 to scroll to portions of the monitor image 34 which are not currently displayed on the monitor. It is conceivable that the user may write outside the writing area 38. When a user writes outside the writing area, the processing unit can include logic for expanding the size of the monitor image area 36 to accommodate positions outside the writing area 38.

Detailed Description Text (215):
FIG. 15A illustrates an control section relative to template data structure which can be stored in the memory 240. The control section relative to template data structure includes a function field 264 and a plurality of coordinate fields 266-280. The plurality of coordinate fields include an x' upper left corner field 266, a y' upper left corner field 268, an x' upper right corner field 270, a y' upper right corner field 272, an x' lower left corner field 274, a y' lower left corner field 276, an x' lower right corner field 278 and a y' lower right corner field 280. The x' upper left corner field 266 and the y' upper left corner field 268 lists the coordinates of the upper left corner of a particular control section 32 on the template 18. Similarly, the remaining coordinate fields 270-280 list the coordinates for other corner of the particular control section 32. The coordinates are listed relative to the template 18. For instance, an imaginary or real

coordinate system can be transposed on the template 18 with the origin of the coordinate system located at one calibration mark 40 and an axis of the coordinate system extending through another calibration mark 40. The coordinates listed in fields 266-280 are measured on the transposed coordinate system. As a result, the listed coordinates indicate the spatial relationship of each control section 32 relative to the calibration marks 40.

Detailed Description Text (217):
FIG. 15B illustrates an control section relative to detectors data structure which can be stored in the memory 240. The control section relative to detectors data structure includes function fields 264 similar to the function fields listed in the control section relative to template data structure. The control section relative to detectors data structure also includes a plurality of coordinate fields 282-296. The plurality of coordinate fields 282-296 include an x upper left corner field 282, a y upper left corner field 284, an x upper right corner field 286, a y upper right corner field 288, an x lower left corner field 290, a y lower left corner field 292, an x lower right corner field 294 and a y lower right corner field 296. The x upper left corner field 282 and the y upper left corner field 284 respectively list the x and y coordinates of the upper left corner of a particular control section 32 on the template 18. Similarly, the remaining fields 286-296 list the coordinates for other corners of the control section 32. The coordinates are listed relative to the detectors 12A, 12B. Specifically, the coordinates listed in fields 282-296 are measured on a coordinate system such as the coordinate systems illustrated in FIG. 11B and/or FIG. 11C. As a result, the listed coordinates indicate the spatial relationship of each control section 32 relative to the detectors 12A, 12B.

Detailed Description Text (222):
The calibration logic may be accessed when the user installs the transcription system on a new writing surface. The calibration logic can also be accessed at the command of the user when the user feels the system may have become uncalibrated. The re-calibrate command can be given by activating a particular control switch 182, by positioning the stylus within the perimeter of a particular control on the template, section or by using a user interface to provide particular input to the processing unit or hardware unit. Further, the calibration logic can be broken up into smaller bits of logic which can be accessed independently as will be described below.

Detailed Description Text (225):
In FIG. 16A, control is passed from the start block 298 to process block 300. At process block 300 the user is directed to touch the stylus 10 to the calibration mark 40 in the upper left corner of the template 18. The direction takes the form of creating a template image 42 on the monitor 22 and showing a stylus 10 contacting the upper left corner of the template 18 as discussed with respect to FIG. 1C. Control is then passed to process block 302 where the time for the position signal 66 to pass from the stylus 10 to the first detector 12A and the second detector 12B, t.sub.1 and t.sub.2, is accessed from the bus 206. Control is then passed to process block 304 where r and l are calculated via Equation 3 and Equation 4. The calculated r and l are stored as r.sub.1 and l.sub.1. Control is then passed to process block 306 where the user is directed to touch the stylus 10 to the calibration mark 40 in the upper right corner of the template 18. Control is then passed to process block 308 where the time for the position signal 66 to pass from the stylus 10 to the first detector 12A and the second detector 12B, t.sub.1 and t.sub.2, is accessed from the bus 206. Control is then passed to process block 310 where r and l are calculated via Equation 3 and Equation 4. The calculated r and l are then stored as r.sub.2 and l.sub.2. ##EQU9## H=y.sub.1 +C Equation 8

Detailed Description Text (260):
When the determination at decision block 384 is positive, control is passed to process block 392 where the t.sub.1 and t.sub.2 values for the transmitted position signal 66 are loaded onto the bus 206. Control is passed from process block 392 to process block 394. Similarly, when the determination at decision block 388 is positive control is passed to process block 394. At process block 394, an identity signal is loaded onto the bus 206. The processing unit 20 can use the identity signal to match the implement being used with a implement listed in an implement identifier field 256 of the implement characteristic data structure 254. As a result, the processing unit 20 can identify the implement being used on the writing

area 38. Control is passed from process block 394 to exit block 396.

Detailed Description Text (266):
The transcription system can also include calibration logic for calibrating the position of a background image relative to a writing surface. The background image may be positioned adjacent the writing surface (e.g., positioned on or behind the writing surface), may form the writing surface, or may be projected onto the writing surface. FIG. 20 illustrates an example process flow for background image calibration logic. The start block 414 is accessed when the processing unit 20 or the hardware unit 14 is notified that a background image 50 will be used with the transcription system. The user can notify the system that a background image 50 is being used by positioning the stylus tip in a particular one of the control sections 32 on the template 18 or by entering information to the processing unit 20 via the user interface 24. Alternatively, the hardware unit 14 can include a control switch 182 which can be activated to indicate that a background image 50 is being used.

Detailed Description Text (268):
Upon saving composite images 52 as Image files, the user can provide each Image file with different identifying characteristics such as different names and/or different locations (i.e. different directories) within the processing unit 20. The different identifying characteristics can be created using traditional file management programs such as WINDOWS 95, PC DOCS and IMANAGE. At process block 416, the user can be presented with a menu listing each of the composite images 52 which has been stored as an Image file or listing each of the Image files in the current directory. The user can scroll through the list to identify the Image file of interest. Once the proper Image file has been identified, the user can select the proper Image file. One suitable method for selecting the proper Image file is using a user interface 24 which controls a cursor, such as a mouse, and double clicking on the identified Image file. Alternatively, the user can select the identified Image file by highlighting the identified Image file and then clicking on a box which may include a word such as "OK".

Detailed Description Text (272):
Additional permutations of the background image calibration logic are also contemplated. For instance, the select background image act illustrated in process block 416 can be replaced with a select background image sequence act. As discussed above a background image sequence can be a sequence of composite images 52 which are established by the user. The user can then advance through the background image sequence to the desired composite image 52. Suitable means for advancing through the overlay image sequence include, but are not limited to, positioning the stylus tip in a particular one of the control sections 32 on the template 18, entering information via a user interface 24 or activating a control switch 182 on the hardware unit 14. Similar mechanisms can be used to reverse through the background image sequence. Further, when a background image is projected onto the writing surface 28, the projector can be coupled with the processing unit 20 and the background images can be advanced or reversed with the composite images 52.

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345/173

Current US Cross Reference Classification (3):
345/175

Current US Cross Reference Classification (4):
345/177

CLAIMS:

8. An eraser according to claim 1 wherein the eraser further includes

a first contact switch for sensing when the first eraser pad is contacted with a writing surface, the first position signal transmitter transmitting position signals when the first eraser pad is sensed by the first contact switch to be in contact with the writing surface; and

a second contact switch for sensing when the second eraser pad is contacted with a writing surface, the second position signal transmitter transmitting position signals when the second eraser pad is sensed by the second contact switch to be in contact with the writing surface.

L5: Entry 4 of 24 File: USPT Apr 3, 2001

DOCUMENT-IDENTIFIER: US 6211863 B1
TITLE: Method and software for enabling use of transcription system as a mouse

Abstract Text (1):
In a transcription system which includes a plurality of signal receivers for positioning adjacent a writing surface and for receiving a position signal transmitted from a stylus when the stylus is positioned adjacent the writing surface, the signal receivers producing timing signals in response to receiving the position signal from the stylus, the transcription system using the timing signals to determine a position of the stylus adjacent the writing surface, a detector assembly comprising: a housing for mounting to the writing surface; a plurality of signal receivers; and at least one user activated control switch whose activation by a user when the detector assembly is mounted to the writing surface produces a control signal which causes the transcription system to perform a function in response.

Brief Summary Text (19):
In another embodiment, a detector assembly is provided which comprises a housing for mounting to the writing surface; a plurality of signal receivers; and at least one user activated control switch whose activation by a user when the detector assembly is mounted to the writing surface produces a control signal which causes the transcription system to perform a function in response.

Brief Summary Text (20):
According to this embodiment, activation of one of the control switches can cause an image displayed on a monitor operatively connected to the transcription system to be modified. Activation of one of the control switches can also cause at least a portion of an image displayed on a monitor operatively connected to the transcription system to be erased, saved, printed, electronically mailed, or facsimiled. Activation of one of the control switches can also cause a writing property associated with a stylus by the transcription system to be changed. Activation of one of the control switches can also cause a color associated with a stylus by the transcription system to be changed.

Brief Summary Text (44):
According to any of the stylus embodiments, stylus may further include a reference signal transmitter for transmitting a reference signal when the writing element is sensed by the contact switch to be in contact with the writing surface. The reference signal transmitter may transmit a variety of signals including infra-red signals and ultrasound signals.

Brief Summary Text (45):
According to any of the stylus embodiments, the stylus may further include a contact switch for sensing when the writing element is contacted with a writing surface, the position signal transmitter transmitting the position signal when the writing element is sensed by the contact switch to be in contact with the writing surface. According to this variation, the stylus may further include a reference signal transmitter which transmits a reference signal when the writing element is sensed by the contact switch to be in contact with the writing surface.

Brief Summary Text (101):
activating a user activated control switch mounted on the writing surface;

Brief Summary Text (102):
producing as a result of activating the user activated control switch a control signal which is communicated to the transcription system; and

Brief Summary Text (104):
According to the method, activation of the control switch may cause at least a portion of an image displayed on a monitor operatively connected to the transcription system to be modified.

Brief Summary Text (105):
Also according to the method, activation of the control switch may cause at least a portion of an image displayed on a monitor operatively connected to the transcription system to be erased, saved, printed, electronically mailed or facsimiled.

Drawing Description Text (39):
FIG. 7D illustrates a detector assembly which includes a hardware unit with control switches and indicators.

Detailed Description Text (16):
The control sections 32 can also be used to control the various functions of other programs. For instance, during a presentation to a group, the transcription system can be used simultaneously with other programs such as POWER POINT. For example, positioning the writing portion of the stylus within a particular control section 32 can cause POWER POINT to move to the next slide or display. Similarly, positioning the writing portion of the stylus within a different section 32 can cause POWER POINT to move to the previous slide or display. As a result, a user can scroll through the slides of a presentation and capture any notes the user makes on a writing surface 28 during the presentation. In this regard, the template can also function as a remote control or mouse for the system for various computer applications.

Detailed Description Text (32):
The user interface 24 can be used to control the display 48 on the calculator image 46. For instance, if the user interface includes a keyboard which is typically used with a PC, the keys on the keyboard can be used to control the display 48 on the calculator image 46. For instance, pressing the number 2 on the keyboard can cause the number 2 to appear in the display 48. Further, if the user interface includes a mouse or other cursor control device, the cursor can be aligned with the keys illustrated on the calculator image 46. Clicking the mouse while the cursor is aligned with a particular key causes the function associated with that key to occur.

Detailed Description Text (35):
When the calculator image 46 is called up, the calculator image 46 can replace the monitor image area 36 on the monitor 22 or can appear over the monitor image area 36 as illustrated in FIG. 1F. When the calculator image 46 appears over the monitor image area 36, the user can switch between the monitor image area 36 and the calculator image 46 by using a user interface 24 such as a mouse to position a cursor on the calculator image 46 or the monitor image area 36. As is known in Windows technology, when the cursor is positioned on the calculator image 46, the calculator image 46 will be moved to the front so it is in full view. Similarly, when the cursor is positioned on the monitor image area 36, the monitor image area 36 will be moved to the front so it is in full view.

Detailed Description Text (39):
Further, the display 48 can also be included on the hardware unit 14. For instance, the hardware unit 14 can include a liquid crystal or LED display as are commonly available in calculators. The display can then be controlled by positioning the stylus in the control sections on the template 18 or by activating control switches on the hardware unit.

Detailed Description Text (82):
The activation electronics 82 can include a contact switch which indicates when the stylus 10 is being used to write. The contact witch typically works based on

pressure being exerted between the stylus 10 and a writing surface 28. In operation, the stylus 10 is held such that the tip 94 of the writing instrument is contacted with the writing surface 28. The pressure of the writing instrument on the writing surface 28 closes the contact switch to activate a circuit within the implement electronics 104.

Detailed Description Text (114):
The activation electronics 82 on the eraser 16 can include a contact switch. The pressure of the eraser pad 122 on the writing surface 28 drives the eraser pad 122 against the contact switch closing the contact switch and activating a circuit within the implement electronics 104. Activating the implement electronics 104 can serve to signal the eraser's 16 operation to the hardware unit 14 and/or the processing unit 20 in a similar manner as discussed with respect to the stylus 10.

Detailed Description Text (119):
As illustrated, the eraser pad 122 may be sized to be a little smaller than the perimeter of the eraser. This sizing of the eraser pad 122 serves to prevent the user from using an edge of the eraser to erase with since erasing using an edge of the eraser may not cause the contact switch on the eraser to be depressed and erasing movement to be detected. This sizing of the eraser pad thus forces the user to place the eraser pad surface parallel to the writing surface in order to erase.

Detailed Description Text (144):
The detector assembly may include a plurality of control switches 182 and an indicator 184, as illustrated in FIGS. 7D, 7F and 7O. The user can activate each control switch 182 to control various functions which are performed by the processing unit 20 or the hardware unit 14. For example, activating a control switch can cause the current monitor image 34 to be saved; cause the current monitor image 34 to be saved and moved to the background while a new monitor image area 36 is brought to the foreground for the creation of a new monitor image 34; cause the current monitor image 34 to be moved to the background while a new monitor image area 36 is brought to the foreground for the creation of a new monitor image 34; cause a copy of the current monitor image to be saved in the background while the current monitor image remains in the foreground for any additional adjustments; cause the entire monitor image 34 to be erased while retaining the current monitor image area 36 in the foreground; bring a new monitor image area 36 into the foreground; maximize the current monitor image area 36 to fill the available space on the monitor; bring the last monitor image area 36 to the foreground when another program was last used in the foreground; notify the processing unit 20 that an overlay has been positioned on the writing surface; notify the processing unit 20 that an overlay has been removed form the writing surface; enable or disable selected functions; change or select the color of particular strokes on the monitor image 34; change the particular color correlated with a particular stylus 10; fax the monitor image 34; E-mail the monitor image 34; and/or print the monitor image 34. As discussed, certain embodiments of the transcription system require calibration, and activating a particular control switch can initiate calibration or recalibration. As discussed, the transcription system can be used simultaneously with other programs. Activating the control switches can serve to control the various functions of these other programs. For instance, actuating a particular control switch can cause POWER POINT to move to the next slide or display. Similarly, activating a different control switch 182 can cause POWER POINT to move to the previous slide or display. A wide variety of additional system functions can be envisioned and are intended to fall within the scope of the present invention.

Detailed Description Text (145):
The indicators 184 can be used to indicate to the user a condition of the system. For instance, an indicator 184 can be an LED which flashes when a power source within the stylus 10 is running low in power, to acknowledge that a control switch 182 has been activated and/or to acknowledge that an error condition has occurred.

Detailed Description Text (146):
As illustrated in FIGS. 6A, 7B and 7C, the first and/or the second detector 12A, 12B can include a contact switch 186 coupled with the detector electronics 130. The contact switch is closed when the detectors 12A, 12B is positioned adjacent the writing surface 28 and is opened when the detectors 12A, 12B are removed from the

writing surface 28. The detector electronics can include logic for identifying when the contact switch has gone from closed to open. In response, the detector electronics 130 can provide a re-calibrate signal which is received by the hardware unit 14. The hardware unit 14 includes logic for identifying the re-calibrate unit.

Detailed Description Text (159):
In each of FIGS. 8A-8C, the hardware unit 14 includes control switches 182. Signals from the control switches 182 and the position signal receiver 60 are received by the hardware controller 200. Suitable control switches 182 include, but are not limited to toggle switches and contact switches. Each hardware unit 14 also includes indicators 184 which can be activated by the hardware controller 200 or the processing unit. The indicators can be used to indicate to the user various conditions of the system. Suitable indicators include, but are not limited to, an LED, an LCD display, an LED display, a speaker for providing audible messages, a beeper and a buzzer.

Detailed Description Text (160):
In operation, the control switches 182 can be activated by the user. Based on the particular control switch 182 which is activated, the hardware controller 200 can perform a particular function itself or can load a second control signal onto the bus 206. The processing unit 20 can include logic for identifying the second control signal and carrying out a function in response to the particular control signal. Examples of functions which can be carried out by the hardware unit 14 or the processing unit are described above.

Detailed Description Text (169):
The hardware units 14 illustrated in FIGS. 8A-8C can include an internal power source such as a battery or can include a cable to an external power source such as a wall socket or the processing unit 20. The hardware units 14 can also include a power switch, such as a toggle switch, for turning the hardware unit 14 on and/or off. One of the indicators 184 can indicate whether the hardware unit 14 is on or off. For instance, the indicator 184 can be an LED which is lit when the hardware unit 14 is switched in. Further, the hardware unit 14 can include a power level sensor for detecting a level of power available to the hardware unit 14. When the available power level falls below a particular threshold level, this can be indicated to the user by an indicator 184. For instance, the indicator 184 can be an LED which is lit when the power level falls below the threshold or an LED used to indicate whether the hardware unit 14 is on or off can flash when the power level falls below a particular threshold.

Detailed Description Text (179):
FIGS. 11A-11B illustrate how the time of flight measurements may be translated into an image on a monitor image area 36. The first and second detectors 12A, 12B are displaced by a distance, L. The writing area 38 has a width dimension, W, a height dimension, H and a diagonal direction, D. Similarly, the monitor image area 36, has a width dimension, w and a height dimension h. Each of these dimensions are illustrated in FIG. 11A. The L, H and W dimensions can be known values or can be determined during calibration of the system. Once, the H and W dimensions are determined, the monitor image area 36 is created on the monitor 22. The monitor image area 36 is created with a h:w ratio which matches the ratio of H:W. As a result, the actual h and w values can vary. After the monitor image area 36 is created, the size and dimensions of the monitor image area 36 can be adjusted by the user using traditional techniques for manipulating windows. For instance, a mouse can be used to click and drag an edge or corner of the monitor image area 36. Further, the size of the monitor image 34 relative to the monitor image area 36 can be magnified and reduced by the user with traditional techniques for magnifying and reducing images on a monitor. An example of a typical techniques for user magnification and reduction of images and image areas is used in drawing programs such as VISIO, etc.. Scroll bars can be included on the monitor image area 36 to scroll to portions of the monitor image 34 which are not currently displayed on the monitor. It is conceivable that the user may write outside the writing area 38. When a user writes outside the writing area, the processing unit can include logic for expanding the size of the monitor image area 36 to accommodate positions outside the writing area 38.

Detailed Description Text (193):
FIG. 15A illustrates an control section relative to template data structure which can be stored in the memory 240. The control section relative to template data structure includes a function field 264 and a plurality of coordinate fields 266-280. The plurality of coordinate fields include an x' upper left corner field 266, a y' upper left corner field 268, an x' upper right corner field 270, a y' upper right corner field 272, an x' lower left corner field 274, a y' lower left corner field 276, an x' lower right corner field 278 and a y' lower right corner field 280. The x' upper left corner field 266 and the y' upper left corner field 268 lists the coordinates of the upper left corner of a particular control section 32 on the template 18. Similarly, the remaining coordinate fields 270-280 list the coordinates for other corner of the particular control section 32. The coordinates are listed relative to the template 18. For instance, an imaginary or real coordinate system can be transposed on the template 18 with the origin of the coordinate system located at one calibration mark 40 and an axis of the coordinate system extending through another calibration mark 40. The coordinates listed in fields 266-280 are measured on the transposed coordinate system. As a result, the listed coordinates indicate the spatial relationship of each control section 32 relative to the calibration marks 40.

Detailed Description Text (195):
FIG. 15B illustrates an control section relative to detectors data structure which can be stored in the memory 240. The control section relative to detectors data structure includes function fields 264 similar to the function fields listed in the control section relative to template data structure. The control section relative to detectors data structure also includes a plurality of coordinate fields 282-296. The plurality of coordinate fields 282-296 include an x upper left corner field 282, a y upper left corner field 284, an x upper right corner field 286, a y upper right corner field 288, an x lower left corner field 290, a y lower left corner field 292, an x lower right corner field 294 and a y lower right corner field 296. The x upper left corner field 282 and the y upper left corner field 284 respectively list the x and y coordinates of the upper left corner of a particular control section 32 on the template 18. Similarly, the remaining fields 286-296 list the coordinates for other corners of the control section 32. The coordinates are listed relative to the detectors 12A, 12B. Specifically, the coordinates listed in fields 282-296 are measured on a coordinate system such as the coordinate systems illustrated in FIG. 11B and/or FIG. 11C. As a result, the listed coordinates indicate the spatial relationship of each control section 32 relative to the detectors 12A, 12B.

Detailed Description Text (200):
The calibration logic may be accessed when the user installs the transcription system on a new writing surface. The calibration logic can also be accessed at the command of the user when the user feels the system may have become uncalibrated. The re-calibrate command can be given by activating a particular control switch 182, by positioning the stylus within the perimeter of a particular control on the template, section or by using a user interface to provide particular input to the processing unit or hardware unit. Further, the calibration logic can be broken up into smaller bits of logic which can be accessed independently as will be described below.

Detailed Description Text (203):
In FIG. 16A, control is passed from the start block 298 to process block 300. At process block 300 the user is directed to touch the stylus 10 to the calibration mark 40 in the upper left corner of the template 18. The direction takes the form of creating a template image 42 on the monitor 22 and showing a stylus 10 contacting the upper left corner of the template 18 as discussed with respect to FIG. 1C. Control is then passed to process block 302 where the time for the position signal 66 to pass from the stylus 10 to the first detector 12A and the second detector 12B, t.sub.1 and t.sub.2, is accessed from the bus 206. Control is then passed to process block 304 where r and l are calculated via Equation 3 and Equation 4. The calculated r and l are stored as r.sub.1 and l.sub.1. Control is then passed to process block 306 where the user is directed to touch the stylus 10 to the calibration mark 40 in the upper right corner of the template 18. Control is then passed to process block 308 where the time for the position signal 66 to pass from the stylus 10 to the first detector 12A and the second detector 12B, t.sub.1 and t.sub.2, is accessed from the bus 206. Control is then passed to process block 310 where r and l are

calculated via Equation 3 and Equation 4. The calculated r and l are then stored as r.sub.2 and l.sub.2. ##EQU3##

Detailed Description Text (238):
When the determination at decision block 384 is positive, control is passed to process block 392 where the t.sub.1 and t.sub.2 values for the transmitted position signal 66 are loaded onto the bus 206. Control is passed from process block 392 to process block 394. Similarly, when the determination at decision block 388 is positive control is passed to process block 394. At process block 394, an identity signal is loaded onto the bus 206. The processing unit 20 can use the identity signal to match the implement being used with a implement listed in an implement identifier field 256 of the implement characteristic data structure 254. As a result, the processing unit 20 can identify the implement being used on the writing area 38. Control is passed from process block 394 to exit block 396.

Detailed Description Text (244):
The transcription system can also include calibration logic for calibrating the position of a background image relative to a writing surface. The background image may be positioned adjacent the writing surface (e.g., positioned on or behind the writing surface), may form the writing surface, or may be projected onto the writing surface. FIG. 20 illustrates an example process flow for background image calibration logic. The start block 414 is accessed when the processing unit 20 or the hardware unit 14 is notified that a background image 50 will be used with the transcription system. The user can notify the system that a background image 50 is being used by positioning the stylus tip in a particular one of the control sections 32 on the template 18 or by entering information to the processing unit 20 via the user interface 24. Alternatively, the hardware unit 14 can include a control switch 182 which can be activated to indicate that a background image 50 is being used.

Detailed Description Text (245):
Control is passed from start block 414 to process block 416 where the user identifies the background image 50 which will be used in combination with the writing surface 28. As described above, the composite images 52 can be created internally or externally and then stored in the processing unit 20 as an Image file. Upon saving composite images 52 as Image files, the user can provide each Image file with different identifying characteristics such as different names and/or different locations (i.e. different directories) within the processing unit 20. The different identifying characteristics can be created using traditional file management programs such as WINDOWS 95, PC DOCS and IMANAGE. At process block 416, the user can be presented with a menu listing each of the composite images 52 which has been stored as an Image file or listing each of the Image files in the current directory. The user can scroll through the list to identify the Image file of interest. Once the proper Image file has been identified, the user can select the proper Image file. One suitable method for selecting the proper Image file is using a user interface 24 which controls a cursor, such as a mouse, and double clicking on the identified Image file. Alternatively, the user can select the identified Image file by highlighting the identified Image file and then clicking on a box which may include a word such as "OK".

Detailed Description Text (249):
Additional permutations of the background image calibration logic are also contemplated. For instance, the select background image act illustrated in process block 416 can be replaced with a select background image sequence act. As discussed above a background image sequence can be a sequence of composite images 52 which are established by the user. The user can then advance through the background image sequence to the desired composite image 52. Suitable means for advancing through the overlay image sequence include, but are not limited to, positioning the stylus tip in a particular one of the control sections 32 on the template 18, entering information via a user interface 24 or activating a control switch 182 on the hardware unit 14. Similar mechanisms can be used to reverse through the background image sequence. Further, when a background image is projected onto the writing surface 28, the projector can be coupled with the processing unit 20 and the background images can be advanced or reversed with the composite images 52.

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345/179

Current US Cross Reference Classification (3):
345/173

Current US Cross Reference Classification (4):
345/178

direction, this indicates that the Y-counter value has exceeded its minimum value (maximum negative) (e.g., the Y-counter has gone below -128 in the present embodiment). Control therefore passes to a process block 738, the Y-counter is set to its minimum value, and the Y-overflow flag is set in the current data packet, indicating the overflow in the Y-counter. Control then passes to the process block 740, wherein the new Y-counter value replaces the previous Y-counter value in the current data packet. The "packet changed" flag is also set, indicating to the keyboard controller 150 that the mouse data packet has changed.

Detailed Description Text (54):
Once the new Y-counter data has replaced the previous Y-counter value in the data packet, control passes to the decision block 742. At the decision block 742, the keyboard controller 150 determines if the right cell 306 is active. If the right cell 306 is not active, then the keyboard controller 150 begins processing the data signals transmitted from the left photo-voltaic cell 304, beginning at a decision block 754. However, if the right cell 306 is active (decision block 742), then control passes from the decision block 742 to a process block 744, and the keyboard controller 150 retrieves the current value of an X-counter. The X-counter value is the horizontal equivalent of the Y-counter value, and serves a similar function (i.e., to indicate the distance that the cursor is moved on the screen 160 in the horizontal direction). Once the X-counter value has been retrieved, the keyboard controller 150 adds the current speed value to the value within the X-counter, to replace the current X-counter value, as represented in a process block 746. When the speed value has been added to the X-counter value, control passes to a decision block 748.

Detailed Description Text (63):
At the decision block 631 (FIG. 6), the keyboard controller 150 determines if the report interval (e.g., the sample interval) has expired. In other words, the keyboard controller 150 determines if it is time to forward a data packet to the host 140. If the report interval has not elapsed, as determined at the decision block 631, control returns to the beginning of the routine, and the keyboard controller 150 again processes the data from the cells 300-306, as explained above. If the sample interval has elapsed, the keyboard controller 150 determines if the current mouse packet has changed, as represented in a decision block 632, by checking the "changed packet" flag. If the data packet has not changed since the transmission of the last data packet, then control returns to the beginning of the subroutine and the packet is not sent. If the report interval has elapsed (decision block 631) and the data packet has changed since the last transmission (decision block 632), then the keyboard controller 150 transmits the mouse data packet to the host 140 via the output port of the keyboard controller 150. The transmission of the mouse data packet occurs in accordance with conventional protocols as if the data packet were from a conventional mouse connected to the serial input port or the mouseport, as is well understood in the art. The transmission of data to the host 140 is represented in an action block 635.

Detailed Description Text (64):
It should be noted that whenever two or more cells 300-306 are illuminated at the same time, the keyboard controller 150 will detect this, and data representing the activity of the active cells will be stored in the packet. Accordingly, if a horizontal cell 304, 306 and a vertical cell 300, 302 are both simultaneously illuminated and remain active for the same period of time, the cursor will effectively move in a 45.degree. direction across the screen 160. If a vertical cell 300, 302 and a horizontal cell 304, 306 are simultaneously illuminated for a portion of a sample interval, and for the remainder of the sample interval only a vertical or horizontal cell remains active, the number of X counts and Y counts transmitted to the host 140 will be uneven, and the angle of cursor movement across the computer screen 160 will be other than 45.degree..

Detailed Description Text (65):
It should further be noted that the data packets as described in FIGS. 7a-7d above, are substantially the same in format as data packets which are generated by mouse pointer devices connected to the serial or mouseport. Furthermore, the mouse commands used in accordance with the present invention follow standard mouse protocol which is well known in the art.

As explained above, the keyboard controller 150 of the present invention interprets the data transmitted by the mouse 100 to emulate the operation of a mouse connected to the serial input port, or the data transmitted by the embedded fingertip mouse 510 to emulate the operation of a mouse connected to the mouseport. Accordingly, when the keyboard controller 150 determines that the right button 116 has been activated, the data which is stored in the data packet currently being constructed for transmission to the host 140 is the same data which would be generated if a mouse were actually connected to the serial input port or the mouseport respectively.

Detailed Description Text (45):
Before the keyboard controller 150 checks the photo-voltaic cells 300-306, the keyboard controller 150 checks a Mouse Timer value, as represented in a decision block 716. The Mouse Timer value indicates the frequency at which the X-count value and the Y-count value are incremented or decremented. As will be discussed in greater detail below, the X-count value and Y-count value are values transmitted by the fingerpoint mouse 100 that indicate the horizontal and vertical distances respectively that the cursor is to be moved on the video display screen. In the present embodiment, the Mouse Timer value acts as a test value or delay time before the keyboard controller 150 proceeds through the photo-voltaic cell detection routine and again increments or decrements the X-count value or the Y-count value, as may be the case. In one embodiment, the Mouse Timer value may be set to 12.5, 25, 50 or 100 increments/decrements of the Y-count and X-count per second. In other words, the Mouse Timer value determines a Mouse Timer period. The Mouse Timer period is the amount of time assigned for each pass through the routine which converts the signals detected from the photo-voltaic cells 300-306 into mouse data. The X-count value and Y-count value are incremented/decremented when appropriate during each Mouse Timer period. The increments/decrements per second (Mouse Timer) value is advantageously set during set-up operations. However, it should be noted that the procedure employed in accordance with the present invention could allow a user to update the Mouse Timer value at any time during the operation of the system. The Mouse Timer value performs a function similar to resolution in a conventional mouse.

Detailed Description Text (51):
It is possible for the Y-counter value to be incremented and/or decremented several times before its value is transmitted to the host 140 in a data packet. Therefore, it is advantageous to transmit data packets at a rate concordant with the incrementing rate of the Y-counter. For example, if a data packet is sent so infrequently that the Y-counter overflows and is reset to its maximum value several times before the data packet is sent, then the speed of the cursor on the computer screen 160 will not accurately reflect the rate at which the Y-counter is being incremented. Hence, there will be little or no difference if the speed value is set to one, two, or three. Thus, it is advantageous if the rate at which the data packets are sent is correlated relative to the speed value.

Detailed Description Text (53):
Once the new Y-counter data has replaced the previous Y-counter value in the data packet (action block 728), control passes to the decision block 730 (FIG. 7c) through the continuation point A. At the decision block 730, the keyboard controller 150 determines if the down cell 300 is currently active (i.e., if the cell 300 currently has light from the photodiode 210 impinging upon it). If the down cell 300 is not active, then the keyboard controller 150 begins processing the data transmitted from the right photo-voltaic cell 306, beginning with a decision block 742. However, if the down cell 300 is active, then control passes from the decision block 730 to a process block 732, and the keyboard controller 150 retrieves the current value of the Y-counter. Once the Y-counter value has been retrieved, control passes to a process block 734, and the keyboard controller 150 subtracts the current speed value (adds a twos complement value, as is well understood in the art) from the Y-counter value, and replaces the original Y-counter value. When the speed value has been subtracted from the Y-counter value (the process block 734), control passes to a decision block 736. At the decision block 736, the keyboard controller 150 determines if an overflow in the Y-counter has occurred in the negative direction. If a negative overflow in the Y-counter has not occurred, control passes to a process block 740. However, if the Y-counter has overflowed in the negative

WEST

End of Result Set

Generate Collection Print

L2: Entry 1 of 1 File: USPT Jun 4, 2002

DOCUMENT-IDENTIFIER: US 6400376 B1
TITLE: Display control for hand-held data processing device

US PATENT NO. (1):
6400376

Brief Summary Text (5):
Devices which display different virtual pages of data stored in the device and/or commands for programs in the device are, of course, well known. (A "virtual page" as used herein refers to a two dimensional representation of data and/or program commands, where the two dimensions may be greater than the size of the portion of the screen available to display it so that only a portion of such data/command representation is visible in a display screen at a given time. In a database, for example, each field of data may be visually represented by its own virtual page.) For example, personal computers can be used to display different data or program commands in different, "windows", where the virtual pages of the data and/or program commands in one or more of the "windows" are larger than the windows. To view different portions of the virtual pages in the "windows", the user must scroll or pan through the page (where "scrolling" the virtual pages involves changing which portion of the data and/or program commands is visible on the display screen). In many such displays, particularly with personal computers, panning or scrolling the virtual page is controlled by either movement of a cursor in the displayed portion of the virtual page or by interface with a control bar along the side of the display screen.

Brief Summary Text (7):
In many such small devices, therefore, the small displays have touch-sensitive or touch-responsive display screens which sense when a certain area of the screen is touched and respond, typically by changing the display on the screen, based on the area of the screen which is touched. Further, some devices detect motion of the device and, responsive to the motion, either scroll or pan the screen over the virtual pages. However, since such screens are hand held and thus often in motion even when the user does not intend to change the display on the screen, control of such operation can be difficult and frustrating. Further, there are significant limitations on using such small portable devices, including in obtaining output (e.g., viewing data on the screen) and in inputting commands (e.g., to change the area viewed on the screen, or to command the performing of a particular function of a program in the device). For example, the limitation on the size of the screen itself generally it must at least be smaller than the small device itself) can make it difficult if not often impossible to show an entire virtual page on the screen. Of course, even if the information on the virtual page could be shown in text size small enough to fit on the screen, it might be too small to be reliably read by the user (particularly given the relatively low resolution typically provided for such screens). Further, given the limited area available, not only on the screen but also on the entire device, as well as the need to provide for easy and reliable operation when held in one hand, it is particularly difficult to provide adequate and reliable user control of the many desired functions of the device.

double-tap, and tap-and-drag inputs to the touch pad. Pan and scroll bar region 16 allows the operator to use four scrolling functions (up, down, left, and right) by pressing on four separate areas of the region which are marked by respective arrows 28, 30, 32, and 34. User-definable function keys 18 invoke commands assigned to the keys in a driver.

Detailed Description Text (4):
Activation mode buttons 20 switch the operation of touch pad 14 (through the computer host software) between different modes. Preferably, touch pad 14 has three modes of operation: annotation, typing, and pointing. Accordingly, activation mode buttons 20 include an annotation (draw) mode button 36, a type mode button 38, and an absolute pointing mode button 40. The operator selects the mode of touch pad 14 by pushing or tapping one of activation mode buttons 20.

Detailed Description Text (6):
When touch pad 14 is in the annotation mode the cursor displayed on the screen changes from the standard windows arrow to a precession select cursor. To leave ink, the operator must click and hold a left side click button 42 located on a left side surface 44 of input peripheral 10. When left side click button 42 is held the cursor changes to a handwriting cursor in the color of the currently selected ink. Moving the cursor by manipulating touch pad 14 leaves ink such that the top of the nib is at the upper left tip of the handwriting cursor. To erase, the operator must click and hold a left forward click button 46 located on left rear surface 48 of input peripheral 10. When left forward click button 46 is held the cursor changes to an erase cursor. Moving the cursor erases the annotation such that the area erased is a circle centered on the current position of the cursor. The size of the circle is based on the current eraser size selected. Input peripheral 10 includes a right side click button 50 located on a right side surface 52 and a right forward click button 54 located on a right rear surface 56. Buttons 50 and 54 perform the same functions as buttons 42 and 46 and may be used advantageously by a left handed person if function keys 18 are placed on the right side of touch pad 14.

Detailed Description Text (8):
When the pen tool control window is displayed on the screen, the cursor is put in relative mode and is restricted to moving within the pen tool control window. Closing the pen tool control window reverts the cursor to the mode it was in when the pen tool control window was invoked. The pen tool control window contains separate controls for changing nib size, shape, angle, ink color, and eraser size.

Detailed Description Text (11):
Pan and scroll bar operation is mode independent. The operator can press on one of arrows 28, 30, 32, or 34 to cause the screen of the host computer to pan or scroll in the direction of the arrow. When used in this manner, the harder the operator presses the arrow, the faster the screen pans or scrolls.

Detailed Description Text (18):
Referring now to FIGS. 18-19, a remote computer input peripheral 100 and 110 in accordance with a second and third embodiment, respectively, of the present invention is shown. Input peripheral 100 differs from input peripheral 10 in the number of user-definable function keys 18 and activation mode buttons 20. Input peripheral 110 differs from input peripheral 10 in that user-definable function keys are arranged around the perimeter of touch pad 14, the number of activation mode buttons 20, and pan and scroll region 16 provides only scrolling (up and down) arrows.

CLAIMS:

1. A hand-held remote computer input peripheral for communicating with a host computer, the input peripheral comprising:

a housing having a top surface, first and second opposed side surfaces, and a rear surface, wherein a human operator holds the housing in space by using a first hand to grip the first side portion;

a touch pad positioned in the top surface of the housing, wherein the human operator

manipulates the touch pad using a second hand;

a plurality of activation mode buttons positioned in the top surface of the housing, each of the activation mode buttons corresponding to a respective activation mode of the touch pad, wherein the human operator switches between activation modes by pressing the activation mode buttons with the second hand;

a plurality of function keys positioned in the top surface of the housing, each of the function keys corresponding to a respective user-defined function, wherein the function keys and the touch pad are operably positioned in the top surface of the housing with respect to one another such that the function keys are actuable by the first hand of the human operator while the human operator holds the housing in space with the first hand and manipulates the touch pad with the second hand; and

a click button positioned on the housing to be actuated by the first hand of the human operator, wherein the click button and the touch pad are operably positioned with respect to one another such that the click button is actuable by the first hand of the human operator while the human operator holds the housing in space with the first hand and manipulates the touch pad with the second hand.

4. The input peripheral of claim 1 further comprising:

a pan and scroll region adjacent to the touch pad, wherein the human operator manipulates the pan and scroll region using the second hand.